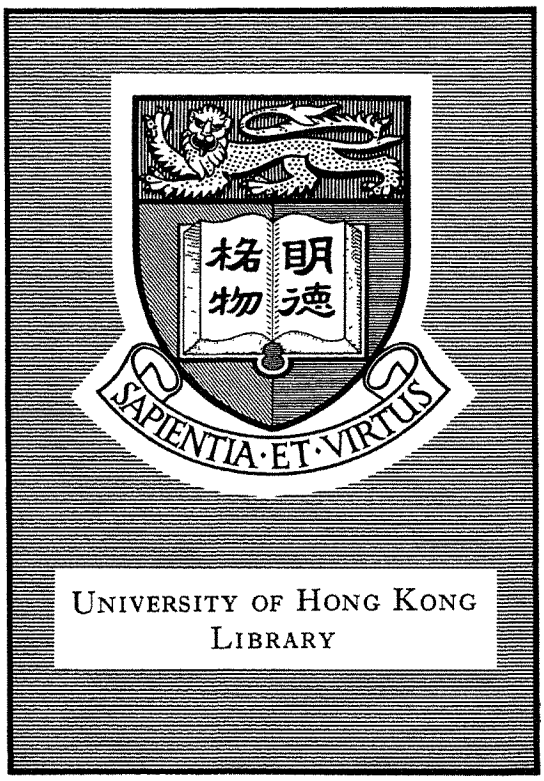

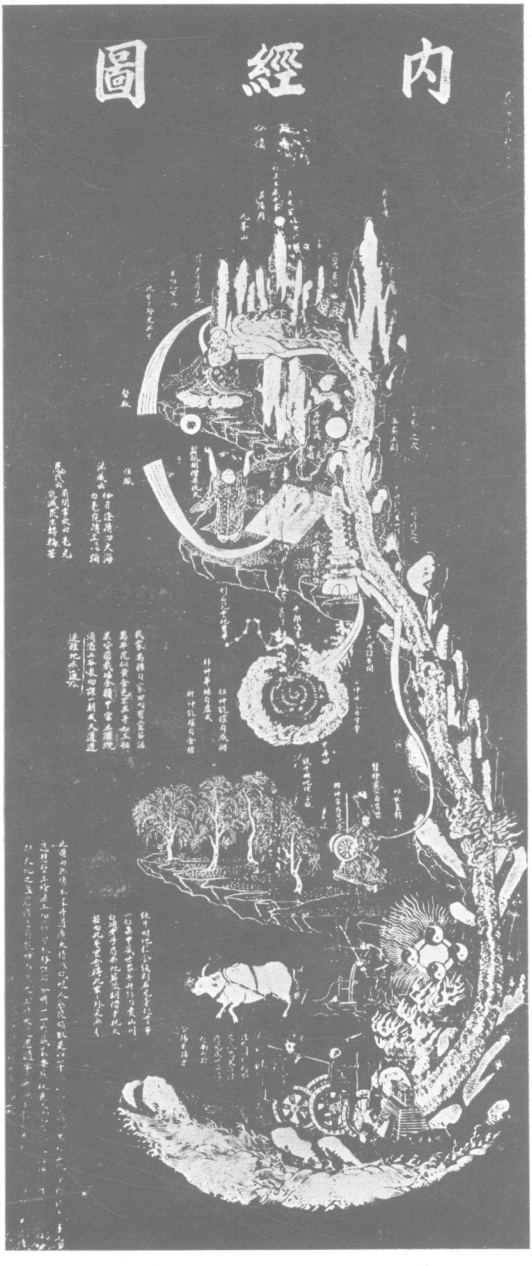

This is a reproduction of a stone rubbing which illustrates Taoist theories of human physiology; since the Taoists were less interested in physiology than practical medicine it is in actuality an attempt to provide an understanding of disease processes.

It illustrates concepts of function of brain, spinal cord, heart, lungs, digestive system, and the urinary system. For example, the cow engaged in ploughing refers to the function of digestion.

PATHOLOGY PROTOCOLS I

(First Term in Pathology)

Department of Pathology
UNIVERSITY OF HONG KONG
1953

PLAN OF THE COURSE, AND SUGGESTIONS AS TO LABORATORY PROCEDURE

This short introduction to the laboratory, the itinerary of slides, lectures, and your protocols are for you. Keep them with you at all times in the laboratory and refer to them frequently.

Class Times: Class meets four times each week, on Monday, Tuesday, Thursday and Saturday. There will usually be two lectures a week, on Thursday and Saturday at 11:30 a.m. Occasionally a lecture may be called for during some portion of the laboratory periods on Monday and Tuesday afternoons. The laboratory periods will be from 2:00 to 5:00 p.m.

General Purpose: The first two terms in pathology are your introduction to the study of disease. The main goal of the course is an understanding of general pathologic mechanisms and a beginning acquaintance with certain specific diseases. During the first term the pathologic principles involved in circulatory disturbances, degenerative changes, and inflammation will be studied, while in the second term the general principles underlying granulomatous inflammation (e.g. tuberculosis, leprosy, parasitic diseases, etc.) and neoplasia (i.e. cancers) will be covered. In each case there will be special emphasis on the understanding of the underlying mechanisms of the disease process and certain diseases will be chosen for study which particularly well illustrate these mechanisms. Thus it will not be possible to study all important diseases in these preliminary courses. It is planned that a more complete review of major diseases be given in a course on systemic pathology later in your studies.

One important part of any introductory course is the acquisition of a vocabulary. You will find that in order to understand published works and lectures you will have to understand terminology. We suggest that when you encounter a new word in lectures, texts or protocols you look it up in the dictionary. You should all have a good medical dictionary. At least every 3-4 students should have with them a dictionary and a textbook of histology in the laboratory at all times.

THE LABORATORY

Microscopic Pathology: Laboratory work consists of a study of disease processes as illustrated by representative microscopic slides from carefully selected autopsy cases. Each section is accompanied by an abstract of the clinical history and necropsy findings in the patient from whom the specimen was taken. The history is not a thing of casual interest, but an integral part of the study of each section. Mere morphology is of little more than academic interest. Morphology when correlated with the patient, his deranged physiology and symptoms, is a living thing and the basis of a real understanding of medicine.

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The Examination of a Section: A section is a snapshot of the gross and microscopic structure of a tissue taken at some moment in its career. That moment is the point of death in autopsies, but can be any moment in the career of an organ if the specimen is taken by biopsy. Within such a specimen are captured many aspects of the past and present history of the tissue and of the larger organism from which it came. If you always look at your sections from this point of view they will be more than mere fixed bits of tissue between glass.

Several pointers on the morphologic approach to a section: Examining a section immediately with the high power of the microscope gives one an impression of the situation much like that of the blind men each examining a small part of the elephant. A logical way to study a section is as follows: First examine the section with the naked eye. You can frequently tell by this means what the tissue is and become generally oriented as to the location of lesion. Second, use the ocular from your microscope as a hand lens and get further orientation. Third, use the low powers of the microscope and finally the high power for cell detail. With this method of approach you will get the most out of the tissue and your time. (A low power—2.2 x—lens facilitates this progressive approach to histopathology. Oil immersion is practically never needed.)

There is one important aspect of examining a section which is not unique to the study of microscopic sections. It is necessary at all times to have a mental picture of what is normal. Without this it is obviously impossible to appreciate the abnormal. Therefore, it behoves you to review your histology and to know at least the basic and identifying parts of each organ and tissue in the body. If any normal sections are available to you they will be invaluable. Your textbook illustrations in histology texts will be of great assistance. Even your pathologic sections can give you some aid since the whole of the section may not always be involved in the disease process.

Notebooks

Periodically you will be assigned slides to draw, describe and discuss. We ask that such a write-up have a particular form as follows:

1. Clinical history and necropsy findings.
2. Drawing.
3. Objective description.
4. Interpretation.
5. Correlations and comments.

Some further comments on each of these divisions is necessary. The abstract of the history is an abstract of an abstract; hence, sometimes it cannot be very much further compressed although frequently it can. It should contain the salient and pertinent

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features of the case to be correlated in parts 4 and 5 with the microscopic findings delineated in **Part 2** and described in Part 3. The drawing should be of representative portions of the section under discussion. Drawings at several different magnifications may be necessary in order to give proper orientation with respect to the whole section and to show important cellular detail. Not all of us are artists. Hence the aim of the drawing is a clear picture of the pathology, not a work of art. Drawings should be properly labelled, indicating clearly the important structures and important changes in the process. **Part 3** is an *objective* description of the contents of the section. We trust you understand the meaning of the word "objective". It does not mean interpretation but rather a description of what you see in the slide, using only those pathologic terms which have previously become a working part of your vocabulary. With such a description any pathologist should be able to visualize the changes which are present even though the disease had never before been described. Once again, you will find this procedure of describing pathologic states not just a part of pathology laboratory but a very important part of all the remainder of your medical career. At first it will seem unnecessarily long-winded and arduous, but later as you develop an approach and a medical vocabulary it will become easier, provided you have acquired good habits. In **Part 4** you are to interpret the pathologic changes in the slide in combination with the gross findings at necropsy and make a pathologic diagnosis. This part then is a logical deduction from Parts 1 and 3, a step you will of necessity be making over and over again from now on in your practice of medicine. The purpose of **Part 5** is to correlate the story of the development of the patient's disease with the findings at the autopsy and in your own specimen. In other words you are to work out the pathogenesis of the disease and the pathologic physiology which went with the morphologic changes. You are not limited to the facts in your history or the observations on your sections but can make use of textbook or library material for facts and theories. This is not, however, the place merely to "sling the bull". Into this part should go observations, facts and thought.

In reality this is a somewhat more elaborate, formal and written protocol of the process through which you should go mentally with each new tissue section you study during this excursion into the study of disease.

Gross Pathology: There will be on certain specified days a study of gross specimens correlated with the phase of the work which you are studying or have just studied. There will also be several short talks on the gross pathology to correlate the changes in the gross specimen with the pathologic physiology and miscroscopic changes. Whenever it is possible fresh, unfixed specimen from current necropsies will be demonstrated to you. On some occasions demonstrations of coloured slides of gross and microscopic specimens will likewise be arranged.

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Examinations: Major departmental written and practical examinations are held at the end of the term. From time to time unannounced 10 minute quizzes will be given in the laboratory. These may be either written or practical. Permission to sit for the final university examination in pathology is contingent on satisfactory performance in these examinations, and in an understanding of pathologic principles as demonstrated in your notebook write-ups and in your performance in the laboratory.

Textbooks: The student is free to pick his own textbook. See supplementary list in this outline for a brief characterization of the leading current texts in pathology.

In addition to the textbooks, certain periodicals are of special interest in the study of pathology. These can be found in the university library. The following are worth becoming acquainted with:—

Journal of Pathology and Bacteriology.
American Journal of Pathology.
Archives of Pathology.
Journal of Infectious Diseases.
Journal of Clinical Pathology and Laboratory Diagnosis.
Journal of Experimental Pathology.

A Brief Evaluation of the Major Current Textbooks in General Pathology

Willis, "Principles of Pathology"—This textbook gives a comprehensive exposition of the general principles of pathology. It is concise, clear and well illustrated. The chapters on neoplastic diseases are especially erudite. The appendix, which contains a list of Greek roots for some commonly used medical terms, a brief note on how to observe, record and read pathology, and a short account of some eminent pathologists, is especially helpful to beginners.

Dible & Davie, "Pathology"—This book discusses comprehensively important pathologic processes thus helping the student to understand pathogenic mechanisms rather than to identify pathologic conditions. It may be difficult for the beginner to appreciate this book. It will serve as a good reference for advanced medical students studying medicine and surgery and obstetrics.

Bell, "Textbook of Pathology" — A good book on general pathology, especially notable for its discussion on renal pathology, in which field the author is an outstanding authority. The general text matter tends to be a little sketchy and brief.

Anderson, "Synopsis of Pathology"—This book is what its title indicates, a synopsis. As such it is a useful book for a quick review and for a quick grasp of the major principles in

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pathology, but it is not adequate to give a comprehensive understanding of the general principles emphasized in the courses in general pathology.

Anderson, *et al.*, "Pathology"—This is one of the most recent and comprehensive works on general as well as systemic pathology. Written by a number of collaborating experts it presents a wealth of authoritative and up-to-date information. It is, in general, too comprehensive for a textbook in a course in general pathology but is an excellent reference work.

Moore, "Textbook of Pathology"—A recent appearance among the texts in this field, which often approaches various aspects of pathology from a fresh approach. It is a very satisfactory textbook despite the fact that it is a little voluminous. Illustrations are good.

Karsner, "Human Pathology"—In general outline and arrangement this text correlates well with the courses in general pathology as taught here. A satisfactory textbook used by many students in the past. The illustrations are not outstanding.

MacCallum, "A Textbook of Pathology"—This book has for long been outstanding for its illustrations. In this respect it surpasses most textbooks. It has been used by many students satisfactorily though the general discussions of principles are more scattered through the book and less grouped than in Karsner's text. Unfortunately, there has been no new edition since 1940.

Smith & Gault, "Essentials of Pathology"—This text is unique in its arrangement in that it attempts to teach by a correlation of case presentation and textual material. Numerous representative photomicrographs in addition make it a book well worth attention, especially as a laboratory guide.

Boyd, "Textbook of Pathology"—This book has been used in many courses in general pathology. It is felt that it is not a satisfactory text, though usable, for the course as here presented. Not to be confused with the following book.

Boyd, "Pathology of Internal Disease"—This book is an excellent text on systemic pathology. It does not, however, readily conform to the first courses in pathology since its scope is limited and does not in general contain discussions of the major principles of pathology as such. Valuable for supplementary reading.

Forbus, "Reaction to Injury"—A recent two-volume set of which only the first volume has appeared in print. A useful book with some original methods of presentation. Its extremely outdated bibliography detracts much from its authoritativeness.

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STAINS AND THEIR INTERPRETATION

The techniques of microscopic morphology are among the important tools employed to study disease. You have learned to observe and interpret the form, size, organization and tinctorial properties of the various structures in stained sections of normal tissues. You will soon appreciate that alterations brought about by disease may completely change the microscopic appearance of a tissue. It must be admitted that in some diseased conditions microscopic changes may be lacking, despite obvious functional abnormalities. However, changes can sometimes be detected by special techniques which would be overlooked in sections prepared and stained by usual methods. Most of the commonly used staining methods are empirical, and trial and error has led to many minor variations of technique. Special methods permit us to identify chemical substances such as fats, glycogen and iron, in properly prepared tissues. Other staining techniques, partly empirical and partly histochemical, enable us to identify some of the cells which produce hormones, or to follow the fluctuating concentrations of certain vitamins. An especially fruitful field in recent years has been the use of chemical indicators in the study of the distribution in the body of enzymes, such as the phosphatases, and lipases. Even fluorescent microscopy, and electronic microscopy, still in the developmental stage, are beginning to be employed in the study of diseased tissues.

It is obvious that many of the special cytological and histochemical techniques are not applicable to the study of tissues obtained at autopsy. Degenerative changes may begin before death, and post-mortem changes may progress rapidly, in the 2 to 48 hours elapsing between death and the autopsy. For this reason the pathologist usually employs a simple, fairly reliable staining technique in his study of diseased tissues. Only with very fresh material, or in investigations of substances which resist post-mortem change, will he employ special fixatives, and the more delicate histochemical staining methods.

Hematoxylin and eosin, the combination most widely used in routine histopathologic work, has been employed for staining most of the sections provided for study. You will find certain inconstancies in staining—depending on the fixative used, and on minor variations in technique.

Hematoxylin

Hematoxylin is without question one of the most important biological stains, especially valuable because of its affinity for nuclear structures. It has striking polychromatic properties, and with proper differentiation yields colours which range from blue-black to violet. In general, and with proper treatment, the hematoxylin used in this laboratory will stain the following:

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Nucleoproteins.

Certain chromatophilic conjugated proteins and above all certain nucleoproteins which constitute important structures of the cell nucleus are stained by hematoxylin. According to the density, arrangement and character of the chromatin we may see nuclei of various types. Some are pale and vesicular with violet or bright blue nuclear membranes and chromatin threads. Some are dense, blue-black masses. Some show distinctive patterns in the arrangement of chromatin. The chromosomal aggregates of mitotic figures and nuclei which are shrunken or fragmented are stained with special intensity. Fading nuclei may be pale blue or violet. Because bacteria contain a high proportion of nucleoprotein they, too, are stained by hematoxylin (but, of course, are seen with ease only when present in colony-like masses). Hematoxylin does not stain all nucleoproteins. (The staining of nucleoli is variable).

Glycoproteins.

Glycoproteins in the form of mucins are stained with hematoxylin. They include mucins formed by glandular epithelial cells, mucinous substances found in the matrix of cartilage and interstitially in connective tissues (Wharton's jelly; tendons; pathologic mucinous degeneration of connective tissue). Mucins in tissues which have been stored for some time and pseudomucins are not stained by hematoxylin.

Calcium.

Calcified masses, or structures impregnated with calcium, are stained deeply by hematoxylin (unless the calcium has been removed by acids, to facilitate cutting).

Miscellaneous.

At times substances which cannot be identified precisely are stained to a variable extent by hematoxylin. These include mast cell granules (rarely preserved in our sections); colloid of the thyroid gland; amyloid; corpora amylacea; the cytoplasm of plasma cells; masses of fibrin.

Eosin

Eosin is a general stain for protein substances. In the absence of a nuclear stain, most tissue elements are stained pink by eosin. In the finished hematoxylin and eosin stained section the following structures are eosinophilic:

Cytoplasm.

Certain cytoplasmic granules (hyaline or colloid droplets; zymogen granules, specific granules of eosinophils, etc.).

Muscle fibres and fibrils of striated muscle.

Stroma of erythrocytes.

Protein precipitates as found in edema fluid, etc.

Fibrin strands and masses.

Abnormal hyaline substances.

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Connective tissue fibres (collagenic especially). Reticular fibres and thin basement membranes are hard to visualize. Elastic fibres may or may not be stained.

Pigmented Substances

Certain substances have colours of their own of sufficient intensity to be evident in the finished sections. These include exogenous pigments; lipochrome pigments; bile; hematoidin precipitates; hemosiderin; melanin; hemoglobin. In the well stained section the brilliant colour of the erythrocytes is due to the combination of eosin and the retained hemoglobin.

Special Staining Methods

Amyloid in unfixed tissue stains a deep brown when treated with aqueous iodide solutions and sulfuric acid. In both unfixed and fixed tissues amyloid is stained red by Congo Red. A metachromatic stain, methyl violet stains the amyloid red and the tissues blue.

Glycogen is soluble in aqueous solutions. To preserve it, tissues must be fixed in absolute alcohol. It can then be demonstrated by Best's carmine which stains the glycogen bright red.

Iron in certain forms can be demonstrated by the use of the Prussian Blue reaction. In the tissues, iron is usually combined with protein and must be freed by treatment with HCl. The unmasked iron combines with potassium ferrocyanide as follows: $4\ Fe\ Cl_3 + 3\ K_4\ Fe\ (CN)_6 = Fe_4\ [Fe\ (CN)_6]_3 + 12\ KCl$. The blue precipitate formed in the section is the Prussian blue. The iron of hemoglobin and some other protein-bound iron cannot be freed.

Mucins are stained a bright red with Mayer's mucicarmine (not the same as the Best carmine stain).

Fats and Lipids. Tissues fixed in formol are cut on the freezing microtome. When stained with Scarlet Red the fat can be seen as bright red or orange droplets. Lipochrome granules usually are orange red. Only neutral fats and certain of the higher lipids are stained.

The Staining of Pathogenic Microorganisms in Tissues. Variants of staining methods used in bacteriology can be used to detect organisms in tissues. We frequently employ the Gram Stain; the Ziehl-Neelsen stain; silver stains for spirochaetes; methylene blue or other simple stains in the search for Gram-negative bacteria. Yeasts and certain fungi can be demonstrated by similar methods or by stains such as Mallory's Aniline Blue Stain, which has an affinity for cellulose.

Stains for Connective Tissue Fibres and Fibrils. These stains are important because pathologic processes so often involve alterations in fibrous structures, or the new formation of fibrous

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tissues. They also are helpful in identifying smooth muscle and nerve bundles, in abnormal tissues. Silvering methods are used to blacken *reticulin* which is not well visualized by other methods. Weigert's method is commonly employed to study the status of *elastic fibres*, in blood vessels and elsewhere. With this stain elastic fibres are dark purple or blue, sharply demarcated. Mallory's phosphotungstic-acid hematoxylin stain gives similar but less consistent results with elastic fibres. It is an excellent stain for *myofibrils* and *neuroglial* fibrils. Aniline blue stains, such as that of Mallory, are the most widely used stains for demonstrating *collagen* fibres, basement membranes, and abnormal *hyaline substances*.

REFERENCE TABLE OF NORMAL VALUES IN CAUCASIAN ADULTS FOR SELECTED LABORATORY TESTS

BLOOD CONSTITUENTS.

Serum pH	7.35	—	7.48
Serum CO_2	22	—	30 mM/L
	50	—	60 vol. %
Serum Cl	99	—	mM/1
	390	—	mgm. %
Serum Na	137	—	147 m. eq./L
Serum Ca	4.5	—	5.5 m. eq./L
Serum Inorganic Phosphorus	2.5	—	4.0 mgm. %
Serum Cholesterol	140	—	225 mgm. %
Cholesterol, Esters	30	—	60% of total
Plasma Proteins, total	6.0	—	7.0 gm. %
Plasma Albumin	4.0	—	6.0 gm. %
Plasma Globulin	1.5	—	2.8 gm. %
NPN (whole blood)	25	—	40 mgm. %
Urea N (whole blood)	9	—	15 mgm. %
Uric acid (whole blood)	2	—	4 mgm. %
Creatinine (whole blood) up to	2.0 mgm. %		
Glucose (venous, unlaked blood filtrate)	60	—	90 mgm. %
Serum Icteric Index	below 6		
Serum Bilirubin—Direct	0.1	—	0.4 mgm. %
Indirect	0.2	—	0.8 mgm. %

CEREBRO-SPINAL FLUID.

Total Protein	20	—	40 mgm. %
Glucose	45	—	65 mgm. %
Chloride—about	125 mM/L		

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URINE.

Sp. Gr. - - - - - - - - - - - - - 1.015—1.022

Urea Clearance - - - - - - - - - - $\frac{U \sqrt{V}}{B}$ 40-65

$\frac{U\ V}{B}$ 60-90

MISCELLANEOUS.

Sedimentation rate (Wintrobe) male, 0—6.5 mm/hr.; female, 0—15 mm/hr.

Gastric Acidity—Free acid, 25—50 units (cc. N/10 HCl per 100 cc); total 50—75 units.

The Congo red test for amyloid is negative if more than 50% of the injected dye is found in a 60 minute sample of blood (using as a 100% standard a sample taken 4 minutes after the dye is injected). To evaluate a positive result the urine must be examined to prove that the dye is retained in the tissue rather than lost by excretion.

RANGE OF NORMAL WEIGHTS AND MEASUREMENTS FOR HUMAN (CAUCASIAN) ADULTS.

Heart	250 — 300 gms.	Liver	1,500 — 1,700 gms.
Lungs (R)	350 — 400 gms.	Brain	1,200 — 1,400 gms.
(L)	300 — 350 gms.	Thyroid	25 — 40 gms.
Kidneys (together)	250 — 300 gms.	Pancreas	80 — 100 gms.
Spleen	100 — 150 gms.	Average male body weight	—70 kg.

HEART.

Wall of left ventricle - - - - - - - - - -	10	— 12	mms.
Wall of right ventricle - - - - - - - - -	2	— 4	mms.
Pulmonary orifice - - - - - - - - - -	7.5	— 8	cms.
Aortic orifice - - - - - - - - - - - -	6.5	— 7.5	cms.
Tricuspid orifice - - - - - - - - - - -	10	— 13	cms.
Mitral orifice - - - - - - - - - - - -	9	— 11	cms.

KIDNEYS.

Cortex - - - - - - - - - - - - - - - -	5	— 6	mms.
Medulla - - - - - - - - - - - - - - - -		15	mms.

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CASE HISTORIES TO SUPPLEMENT HISTOPATHOLOGICAL SLIDES

23—Calcification, *Fibromyoma of the broad ligament.*

The patient, a 32 year old Chinese woman, gave a history of sterility for 12 years following previously demonstrated fertility. She had occasional abdominal pain during menstruation. A hard, irregular mass was felt in the lower abdomen. It was not tender or movable. At laparotomy a tumour mass weighing 568 gms. and measuring 11 × 10 × 10.5 cms. was removed from the right broad ligament. The mass grated against the knife when cut. Its cut surfaces were greyish-yellow.

72—Passive Hyperemia, *Spleen.*

A 51 year old Chinese farmer complained of rapid enlargement of his abdomen over a period of 5 months. He had noted swelling of his legs for 2-3 months. His appetite was poor and he had suffered a marked loss of weight. On admission to the hospital he showed slight jaundice, the abdomen was markedly distended and a fluid thrill and dullness were noted. The liver was 4 finger-breadths below the costal margin in the mid-clavicular line. The direct Van den Bergh test gave a reaction in 5 minutes and the indirect Van den Bergh reaction showed 2 mgm. % bilirubin. Paracentesis yielded bloody ascitic fluid. At *autopsy* the liver weighed 4,050 gms. There was a large, firm, 15 cm. greyish-yellow tumour mass in the upper portion of the right hepatic lobe. Numerous firm, yellow to green tumour nodules varying in diameter from 5-10 mm. were scattered throughout the liver. Metastases were found in the lungs and regional lymph nodes. The spleen weighed 312 gms. It was firm and the cut surfaces were purplish red and much blood could be scraped from the surfaces.

150—Post-Mortem Blood Clot.

This was an incidental finding in a 25 year old Chinese man who died following admission to the hospital in a comatose condition. At *autopsy* calculi were found in the orifice of the right ureter. This ureter was dilated and thickened having a diameter of 40 mm. while the left had a diameter of only 12 mm. The cortices and medullae of both kidneys were thinned and the renal pelves were greatly dilated.

180—Anthracosis, *Lung.*

This 44 year old Chinese woman had a history of cough and dyspnea of 2-3 years' duration. At *autopsy* the heart was enlarged and dilated, the lungs congested and edematous and the liver, spleen and kidneys gave evidence of chronic passive congestion. The lungs also showed emphysematous bullae in the upper lobes and their cut surfaces were almost black. The hilar lymph nodes were black.

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255—Arteriolar Sclerosis, *Kidney.*

No clinical history is available on this 76 year old Chinese man. At *autopsy* the left ventricle was dilated and hypertrophied. The basal arteries of the brain were arteriosclerotic and there were infarcts in the right occipital lobe and in the left hemisphere. The former was 4 cms. in diameter and the latter 3 cms. Both were soft, cystic and oozed turbid bloody fluid on gentle pressure. Both kidneys were small, each weighing 71 gms. Both renal arteries had markedly thickened walls. The capsules of both kidneys stripped with great difficulty tearing off bits of parenchymal tissue in the process. The renal surfaces were finely granular. The right renal cortex was 3 mm. thick and the medulla 9 mms. while the left cortex measured 3 mms. and the medulla 12 mms.

Additional History: In the above patient the course of the disease presumably was relatively slow and the terminal events were those of a vascular accident resultant from the generalized arteriosclerosis. The following history presents a more rapid course with the terminal events more closely allied to the renal disease.

A 53 year old freight agent first noted malaise, anorexia and failing vision 4 months ante-mortem. Extraction of all his teeth, on advice of his physician, failed to relieve him and he was admitted to a hospital. He was found to have a large heart; a B.P. of 230/150; severe retinopathy, with tortuous "silver-wire" arteries and A-V nicking. Laboratory findings included 3 + albuminuria; BUN 22 mg.%; Hb 13.5 gms.%. His downhill course was rapid. Within a few weeks his urinary output diminished from 1,500 ccs. daily to only a few hundred ccs. (oliguria). His urine contained red cells and was often frankly bloody. Terminally his temperature rose to 103° and uremic frost appeared on his skin (no blood chemistry available at this period). The *autopsy* revealed severe arteriolar nephrosclerosis; a large heart (620 gms.); heavy, wet and bloody lungs; passive hyperemia, chiefly of abdominal viscera; severe peptic esophagitis. The right ventricle was dilated, while the contracted left had a wall 18 to 20 mms. thick. The cut surfaces of the myocardium were mottled with poorly demarcated yellowish spots 1 to 4 or 5 mms. in diameter. These were coarser and more irregular in pattern than in the usual tigroid mottling. Fat stains disclosed fatty degeneration of the myocardium. The kidneys were large, each weighing 180 gms. Their capsules were only slightly adherent and their surfaces were red and granular. On the cut surfaces the parenchyma was red with obscured markings. However, tiny red dots corresponding to glomeruli could be made out. The cortex averaged 9 to 10 mms. in thickness.

264—Chronic Passive Congestion and Edema, *Lung.*

Chinese man, age 31. No history available. Compare history 1239 and 4957.

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At *necropsy* the heart weighed 624 grams. Yellowish vegetations with calcification were found on the aortic and mitral valves. The right lung weighed 906 grams and the left lung 765 grams. They were voluminous and purplish-blue. Fluid oozed from their cut surfaces and was readily expressed from the bronchioles. The firm spleen weighed 298 grams and contained two infarcts. The liver showed "nutmeg" mottling and the kidneys were enlarged, purplish red and bloody.

347—Hemorrhage, *Retinal.*

This 32 year old Chinese male was admitted to the hospital with a history of convulsions. *Autopsy* revealed massive left cerebral hemorrhage and microscopic examination disclosed retinal hemorrhage. The kidneys were small. The renal capsules were adherent and stripped with difficulty revealing a granular cortex. There were mild atheromatous changes in the aorta and renal arteries. On microscopic examination the kidneys revealed chronic pyelonephritis and diffuse hyperplastic sclerosis.

348—Typhoid Fever.

No clinical history is available for this 25 year old Chinese man. (Compare History 5097). At *autopsy* numerous ulcers were found in the gastro-intestinal tract, extending from a point 5 feet from the duodenum to the proximal portion of the ascending colon. The Peyer's patches were all involved. In some areas, the wall of the intestine was so thin and friable that tears readily occurred on examination. The mesenteric lymph nodes were all enlarged.

748—Fibrinopurulent Pleuritis.

This 7 month old Chinese boy had a history of cough and fever for 10 days. *Autopsy* findings are not available.

Substitute History: A 57 year old housewife was known to have had diabetes for 6 years before her final admission. Her symptoms had included polyuria, polydipsia, itching, blurred vision, neuritic pains and weight loss. Her glycosuria was controlled by diet and insulin. Her final admission followed an acute episode initiated by a chill and epigastric pain. Physical findings indicated a pneumonia and type V pneumococcus was recovered from the sputum. Specific anti-serum and intravenous sodium sulfadiazine were started but the following day marked oliguria developed. She died 3 days later with symptoms of heart failure. At *autopsy* there was a resolving lobar pneumonia of the right upper lobe and patchy pneumonia in the other lobes of both lungs. Easily torn fibrinous adhesions were found in the right pleural cavity. An opaque granular layer of fibrin covered the right upper lobe, and there were thicker patches of fibrinous exudate over the right lower lobe. It was thought that death was due to acute interstitial nephritis and myocarditis of the type caused by hypersensitivity to sulphonamides.

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961—Embolic Abscesses, *Liver and heart.*

A Chinese man, aged 30, had a history of continuous fever for one month accompanied by general malaise, cough and pain in the chest on respiration. At *autopsy* both lungs were dark red with irregular patches of increased consistency. The right lung weighed 508 gms., the left 453 gms. The 258 gm. heart was covered by a fibrinous exudate and the myocardium was flabby. Section of the myocardium revealed many small greyish-yellow abscesses. The liver weighed 1,926 gms., was soft and on its capsular surface showed many yellowish spots 0.5 to 2 mm. in diameter each of which had a surrounding dark red rim. Cut section of this organ disclosed many small irregular cavities filled with purulent matter. The right kidney weighed 113 gms., the left 142 gms. Both were soft and showed numerous small abscesses throughout their substance. The primary source of the infection could be demonstrated.

1239—Rheumatic Pancarditis.

No clinical history is available for this 15 year old boy. At *autopsy* the body was that of a poorly-nourished male measuring 130 cms. in length and weighing an estimated 60 lbs. The heart weighed 540 gms. The visceral and parietal layers of the pericardium were firmly adherent to each other, completely obliterating the pericardial sac. The wall of the left auricle was slightly thickened but the remainder of the myocardium was not grossly abnormal. On the mitral valve there were adherent friable vegetations along the free margin. The liver showed typical "nutmeg" mottling. The mediastinal tissues were edematous and the right pleural cavity contained 240 ccs. of clear fluid while the left pleural cavity contained 270 ccs. of a similar fluid. The left lower pulmonary lobe was atelectatic as was also the right lower lobe which showed, in addition, changes attributable to bronchopneumonia.

An additional illustrative history is as follows:

An underdeveloped boy of 14, admitted 2 weeks before his death, was first known to have cardiac disease after an attack of scarlet fever when he was 5. His activities were restricted from the age of 6 years. He came from a poor home and nothing is known of his early symptoms, nor of findings during 3 previous hospitalizations. During the last 5 years he frequently had migratory joint pains without gross findings. For the past month his school teacher had noticed that he was very dyspneic, and had a fast pulse. She brought him to the Clinics where he was found to have a pulse of 100; respirations 36 per min.; B.P. 115/40; temperature 37.4° C. His heart (145″ oversize by X-ray) caused his precordium to bulge, and extended 14 cms. to the left in the 6th interspace. He had a Corrigan pulse; a Duroziez's sign, throbbing carotids, and visible capillary pulsations (in nailbeds, retinae). A continuous apical thrill and presystolic and systolic

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apical murmurs were noted, as well as a diastolic murmur along the left border of the sternum. He had dullness and bronchial breathing in the left chest and X-rays demonstrated pulmonary passive hyperaemia. His liver was large; there was non-tender general lymphadenopathy, and he had prominent frontal bossae (rachitic ?, Wasserman and Kahn tests negative). An EKG revealed a prolonged PR interval. His WBC was 13,000 with 56% Pmns.; Hb. 12.0 gms. %; urine normal save for a few white cells; sedimentation rate 60 mm. per hour. Despite bed rest and digitalization, dypsnea suddenly increased 10 days after admission. The boy became cyanotic; his liver was larger and was tender; basal rales were heard. Shortly, peripheral edema appeared and a little later, anorexia and vomiting. The respiration rate rose to 56, and heart beats were so forceful as to shake the bed. Terminally, oxygen did not influence the increasing cyanosis. The *autopsy* revealed a rheumatic pancarditis with active myocarditis; aortic and mitral valvulitis; obliterative fibrous and fibrinous pericarditis. Other findings were hyperplastic arteritis (of small arteries); mild chronic synovitis; fibrous and serofibrinous pleuritis; ascites; pulmonary chronic passive hyperaemia of abdominal organs; oedema of the ankles and scrotum. Although the boy was small (58 in., Wt. 93 lbs.), his heart weighed 900 gms. All chambers were enlarged and the wall of the left ventricle measured 14 to 18 mms., while that of the dilated right ventricle was 3-7 mms. thick. The sclerotic, white, focally calcified mitral leaflets were fused and had thick short chordae tendineae, and an orifice admitting only 2 fingers (instead of 4 or 5). Above it the left atrial endocardium was also thick and white. The aortic orifice measured 7 cms. in circumference, but its cusps were stiff and retracted. A white fibrous area covered the septum just below this valve. The other valves were not deformed, but were overstretched. The red-tan myocardium was not grossly scarred.

1275—Biliary Cirrhosis, *Obstructive with Bile Pigment.*

Caucasian man, aged 59. No history available. The clinical diagnosis was carcinoma of liver. *Autopsy* disclosed a greyish-yellow tumour mass measuring 17 × 15 × 7 cm. located on the inferior surface of the liver in the portal area. The tumour mass was clearly demarcated from the liver but adherent to it. The common bile duct was embedded in the tumour. The cut surfaces of the liver were dark green and the liver lobules stood out distinctly. The left hepatic lobe was atrophic. Together with the tumour the liver weighed 4,900 gms. Tumour metastases were found in the regional lymph nodes, omentum, peritoneum, intestines, supra-renal glands and diaphragm.

1314—Subacute Bacterial Endocarditis.

A 42 year old Chinese woman complained of dyspnea and palpitation for 4 months. The symptoms increased in severity and swelling of the legs developed. There was low grade fever and

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anorexia for 3 months prior to admission. On hospitalization her face was puffy, her lips were pale and there were conjunctival hemorrhages. The heart was grossly enlarged and a rough systolic murmur could be heard in the mitral area. The liver and spleen were palpable and tender. RBC 2.0 million; Hb. 43%; WBC 12,000. Blood culture was negative. Two weeks after her admission she developed a left hemiplegia with loss of sphincter control and deviation of the eyes to the right. She died one week later. At *autopsy* numerous petechiae were noted over the left thigh. The heart weighed 425 gms. and the auricular surface of the mitral valve was covered with friable granular, yellow vegetations which extended to the lateral margins of the left auricle. The spleen contained many irregular, greyish-yellow patches which were moderately firm and raised slightly above the capsular surface. On section of the spleen 4 yellowish-red, firm, roughly triangular infarcts with their broadest portion adjacent to the capsule were seen.

1489—Aspirative Bronchopneumonia.

Clinical history is not available on this 20 year old Chinese woman. From the autopsy findings it would seem that she had been suffering from some constricting lesion of the lower esophagus and that an attempt had been made surgically to alleviate her distress by anastomosing the stomach to the esophagus at a point in the thorax above the esophageal stricture. Subsequently she developed a purulent mediastinitis with abscess formation about the operative site. At *autopsy* the post-operative state, surgical anastomosis, mediastinitis, and extreme emaciation were noted. There was a small opening at the bifurcation of the trachea which communicated with an abscess cavity lying between the esophagus and the trachea. Both lungs displayed an abscessive, aspirative bronchopneumonia having a foul odour.

1782—Septic Embolism and Infarction, *Kidney* (Compare History 1314).

A Chinese man, aged 22, gave a history of rigor and fever of two weeks' duration. *Post-mortem* examination disclosed a thickened aortic valve with rolled margins and a thickened mitral valve having a small ulcer on its auricular surface. There were granular, yellowish vegetations on the mitral valve. The left ventricle was slightly hypertrophic and the heart weighed 284 grams. There was a triangular infarct in the spleen and a number of greyish pustules rimmed by red margins. There were also multiple small infarcts in the kidneys, each of which weighed 114 grams.

1833—Chronic Passive Congestion, *Spleen.*

This 32 year old Chinese woman had palpitation and breathlessness for two years. At intervals she exhibited signs and symptoms of congestive heart failure. Physical examination disclosed

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systolic and diastolic murmurs over the precordium and apex. *Post-mortem* findings included: heart weight 284 gms., marked dilatation of right auricle and ventricle, granular tricuspid vegetations, thickening of pulmonary and tricuspid valves. The spleen weighed 226 gms., was firm and purplish and blood oozed from its cut surfaces. The liver weighed 1,418 gms., was purplish red and had a granular surface.

1924—Canalized Thrombus, *Renal artery.*

A 51 year old Chinese man gave a history of hypertension.

At *autopsy* there were extensive atheromatous changes in the basilar artery and the aorta. The cortices and medullae of both kidneys were decreased in thickness. The renal arteries were narrowed and the right renal artery had a pin-point lumen.

1959—Corrosive Gastric Necrosis, *Lysol Poisoning.*

No history available. It is known that this individual had swallowed Lysol in order to commit suicide.

1960—Diphtheria.

A 3 year old Chinese girl had a history of fever and cough for 8 days and respiratory distress for 4 days prior to admission to the hospital. On admission a dirty greyish membrane was found covering the left tonsil. The temperature was 102° F. Tracheotomy was performed on admission but the patient died the day after admission. At *autopsy* a greyish-white membrane covering both tonsils and the epiglottis had extended downward to the bronchioles. It was firmly adherent to the underlying mucous membranes. Both lungs were voluminous and showed areas of increased consistency which on cut surface were evidently bronchopneumonic patches. The lumena of the bronchioles were filled with dirty greyish membranous material.

2072—Hemorrhage, *Intracranial.*

A Chinese woman, aged 34, was admitted to the hospital with a history said to be suggestive of meningitis. At *autopsy* the brain weighed 1,164 grams. The frontal lobes were partially covered by a blood clot. A hemorrhagic area was found in the left occipital lobe measuring 25 × 6 mm. Several hemorrhagic areas measuring from 5-10 mm. in diameter were noted in the left frontal lobe.

Additional History: A 53 year old labourer "lost a bout with Bacchus" and fell, striking the back of his head on some concrete steps. A week later diplopia and rapidly increasing stiffness of the neck and jaw developed. He was immediately hospitalized and 120,000 tetanus antitoxin units were administered. Heavy doses of sulfadiazine, avertin and chloral hydrate were employed without benefit. *Autopsy* revealed a linear fracture of the occiput and a surgically debrided scalp wound. There were superficial subarachnoid hemorrhages in the occipital region and contrecoup hemorrhages over both frontal lobes. The cerebrospinal fluid was bloody. (As usual there was no histologic proof of tetanus).

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2113—Wound Healing, *Skin*.

A 5 year old Chinese girl was operated on for intestinal obstruction. She died after the operation and no further clinical details are available. At *autopsy* the 11.5 cm. long abdominal surgical incision, extending from the umbilicus to the pubis, showed early healing. Information as to the time between operation and death is not available, but judging from the degree of healing in this section death probably occurred on the third or fourth post-operative day.

2227—Hypostatic Bronchopneumonia.

This 29 year old Chinese woman was hospitalized because of cardiac symptoms referable to a septal defect. At *autopsy* there was some evidence of heart failure in that there was pitting edema of the lower extremities, 150 ml. of clear yellowish fluid in the peritoneal cavity, 30 ml. of fluid in the right pleural cavity and 100 ml. of fluid in the left pleural cavity. Both lungs were edematous, the right weighing 370 gms. the left 484 gms. The lower left lobe was firm and much sanguinous, turbid fluid oozed from its cut surface. About 1/5th of the right upper lobe disclosed a similar condition.

2278—Acute Passive Congestion, *Lungs*.

This 39 year old Chinese woman had a history of pre-eclampsia. *Necropsy* disclosed heavy (right 454 gms. left 312 gms.) lungs which were purplish red. Fluid flowed from the cut surfaces. The heart was flabby and the right auricle and ventricle were dilated. A portion of the placenta remained in the uterine cavity and there was clotted blood in the uterus.

2410—Portal Cirrhosis, *Liver*.

A Chinese man, aged 32, was hospitalized when he gave a history of hematemesis. At *autopsy* the liver weighed 1,022 gms. The external surface and the cut surface were brownish-yellow and coarsely nodular. Its substance was firm and cut with increased resistance. At a point 2½ cms. above the origin of the splenic vein, the portal vein was completely filled with a thrombus showing a mixed dark red and greyish-white appearance. Just below the origin of the splenic vein the superior mesenteric vein was likewise filled with a similar thrombus. The lower half of the esophagus showed prominent venous varices and the gastro-intestinal tract contained a large amount of dark red blood. The spleen was congested, weighing 397 gms.

2554—Abscess Resulting from Mycotic Embolism, *Lung*.

A 21 year old Chinese man had a sudden onset of chills followed by fever two weeks before hospitalization. Four days later he developed pain in the right upper abdominal quadrant and two days before admission he brought up a small amount of blood

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streaked sputum on coughing. On admission his temperature was 103.4° F., pulse 134. There was tenderness in the right hypochondrium but the liver was not palpable. WBC counts ranged from 10,000 to 25,000 with 85% neutrophiles. One week after hospitalization he developed jaundice but a laparotomy revealed no abdominal abnormality. Subsequently it was thought that he developed a hypostatic bronchopneumonia before his death. At *autopsy* an abscess 12 mm. in diameter was found in the right lobe of the liver adjacent to the vena cava. The adjacent portion of the vena cava was partially thrombosed. The liver weighed 1,518 gms. The lungs contained a number of abscesses and in the right upper lobe there was a dark red, firm, wedge-shaped infarct measuring 10 × 17 mm. The right lung weighed 681 gms., the left 624 gms.

2682—Purulent Meningitis.

A 5 month old Chinese boy was hospitalized because of fever of one day's duration and difficulty in respiration. He was slightly cyanotic but chest and throat examination revealed no abnormalities. On the second hospital day multiple petechiae appeared on thighs and buttocks. A lumbar puncture was negative. The patient died on the third day of hospitalization. At *autopsy* numerous petechial hemorrhages were found over the back, chest, and all extremities. The meninges were markedly edematous and the cerebral convolutions were flattened. The meningeal vessels were dilated and congested. Yellow, purulent matter covered the whole surface of the cerebrum and cerebellum and was most extensive about the base of the brain. The pus was also densest along blood vessels. Both lungs displayed irregular dark red patches of increased consistency (bronchopneumonia).

2700—Fatty Degeneration, *Liver*.

A Chinese woman, aged 32, was brought to the mortuary with an accompanying history of normal pregnancy terminating in normal delivery one month previously. Subsequently she developed shortness of breath and died suddenly. At *autopsy* the lungs weighed 370 and 256 gms. They were hyperaemic. The liver was yellow and very soft, and it floated when immersed in water. It weighed 1,362 gms. The uterus and other organs appeared normal.

Additional History: A boy of 4 became ill with a violent attack of vomiting a few hours after his mother had taken a piece of fireworks from him. This was a so-called "son-of-a-gun" (contains yellow phosphorus). He had had it in his mouth. On the 4th day (two days before death), he became markedly jaundiced, complained of pain in the abdomen, and developed a fever. The abdomen became distended, and he developed rigidity of the neck, projectile vomiting and paralysis, and a diagnosis of meningitis was made. *Necropsy* revealed marked fatty degeneration and infiltration in the liver, which was light yellowish-brown

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and enlarged. Histological examination of the brain showed no inflammation. There were marked fatty changes in the parenchymatous elements of all organs examined, and hemorrhages in many tissues.

2757—Embolic Abscesses, *Kidney.*

No history is available on this 4 day old Chinese girl.

At *post-mortem* examination the pericardium was covered by a fibrinous exudate. The lungs contained areas of bronchopneumonia with abscess formation and there were small abscesses in the left kidney. Both liver and spleen showed marked hyperemia.

2776—Hyperplasia, *Prostate.*

A Chinese male, aged 60, had a history of ureteral and urinary bladder calculi, and of an enlarged prostate. The prostate was removed surgically. Its middle lobe was firm, nodular and enlarged, measuring 4.5 × 4 × 2 cm.

2864—Subacute Bacterial Endocarditis.

A Chinese woman, aged 25, was admitted to the hospital with a history of palpitation for 7 months, dyspnea for 3 months. The dyspnea was increasing in severity progressively. She had a cough for one month. On physical examination her complexion was sallow, she had a low grade fever of 99.4° F., her heart was enlarged with the apex beat at the 6th intercostal space, ½ inch beyond the mid-clavicular line. A to-and-fro murmur was heard over the aortic area with conduction of the murmur along the left sternal border. There was a rough diastolic murmur at the apex. The liver was palpable and tender, but the spleen was not palpable. WBC 12,000. The patient's general condition continued to deteriorate after hospitalization and she died one week thereafter. At *autopsy* there was marked clubbing of fingers and toes. The heart weighed 483 gms. The aortic valve was markedly deformed and covered with hard, friable, yellowish vegetations. The leaflets of the mitral valve had nodular thickened margins. The liver weighed 1,172 gms. and on cut surface presented a typical "nutmeg-like" appearance. The 215 gm. spleen was firm and its cut surface dark red.

2984—Acute Appendicitis. U.C. 2789.

No history is available for this section. The following history from a similar case is substituted.

A 15 year old boy, in the hospital for treatment of a residual poliomyelitis, was awakened in the night by a dull aching generalized abdominal pain. The pain was continuous. Several hours later he had a loose bowel movement with partial relief, and immediately following this he vomited. The pain diminished in intensity but became localized within a few hours in the right

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lower quadrant. He had a temperature of 99.2° F.; pulse 120; rebound tenderness at McBurney's point on the abdomen; urine negative; WBC 9,500 with 85% polys. The patient was operated upon immediately and a markedly edematous and inflammed appendix was removed. Recovery was uneventful.

2985—Chronic Ulcerative Colitis. U.C. 6571.

This 57 year old Caucasian moving and freight express worker, gave a twenty-year history of continuous diarrhea with 10-15 bowel movements per day. About one year before his hospitalization he developed symptoms suggestive of gall-stones and had transient episodes of jaundice. He also had intermittent gastric pains and occasional episodes of chills and fever. On hospitalization he was jaundiced, stuporous, had an enlarged liver and spleen, marked pitting edema of the ankles and shifting abdominal dullness. RBC 2.36 million, Hb 7 gms; WBC 4,850, icteric index 64, plasma proteins 6.76 and NPN 16. Proctoscopy revealed ulcerative colitis. X-ray examination confirmed this diagnosis and revealed in addition a large duodenal crater, left pleural effusion and questionable esophageal varices. The stools were persistently positive for blood. In preparation for surgery he received 8,200 ml. of blood, vitamin K and Amigen (a parenterally administered protein hydrolysate). Five weeks after admission to the hospital a cholecystectomy was performed and bits of "gravel" were found in the common bile duct. An exteriorly draining T-tube was placed in the common duct. Following operation he vomited frequently, became incontinent, and comatose. The terminal blood NPN was 154 mgm.%. He expired two weeks after the operation. At *autopsy* the operative incisions were healing. There was intrahepatic choledocholithiask, pylethombophlebitis, intrahepatic cholangitis, bilateral icteric nephrosis, jaundice, ulcerative colitis and enteritis, pulmonary hemorrhage, hydrothorax, hydropericardium, ascities, myeloid hyperplasia, extramedullary myelopoiesis and minimal arteriosclerosis. No esophageal varices could be demonstrated. The duodenal ulceration seen was not characteristic of peptic ulcer but was similar to ulcerations seen elsewhere in the intestinal tract. There were numerous, scattered, longitudinal ulcers in the ileum, increasing in number towards the terminal portion of the small intestine. The caecum and ascending colon revealed similar ulcerations as did the rectum, but the remainder of the large bowel was not so affected.

2986—Lobar Pneumonia, *Pneumococcal*. U.C. 6173

This 36 year old Caucasian male factory worker suffered from Hodgkin's Disease for 10 years. He was hospitalized finally because of his increasing weakness, weight loss, persistent cough and daily afternoon fever (102°-104° F.). He was treated with arsenicals. On the 20th hospital day his fever increased, reaching 105° F. A right pleural friction rub developed, scattered moist rales were heard and purulent sputum appeared. His WBC count

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rose to 19,750. He became comatose, his dyspnea became more severe, cyanosis deepened and he quickly expired. At *autopsy* besides the Hodgkin's Disease, a lobar pneumonia of the upper and middle right lung was found. This lung weighed 1,220 gms. while the left, containing some lymphogranulomatous tissue, weighed only 740 gms. The right pleural surfaces were coated with fibrin. The consolidated upper and middle lobes held their shape. On the cut surface they were greyish-red and dry, whereas the lower lobe was dark red and boggy.

2988—Amyloid Degeneration, *Spleen, Kidney, Adrenal, Liver.* [U.C. 4226.

A Caucasian man of 21 years, under collapse therapy for pulmonary tuberculosis, developed an empyema. In an attempt to sterilize the cavity an oleothorax was produced using antiseptic oil. For 5 years the empyema drained and although his sputum did not contain tubercle bacilli, he became very emaciated. He finally was hospitalized for a thoracoplasty. Shortly after the first stage, albuminuria (2-4 plus) and oedema of the ankles and diarrhea were noted. His plasma proteins fell, the blood NPN rose, the urea clearance dropped to 5.9. However, a Congo Red test was negative or only doubtfully positive for amyloid. This was explained by the findings at *autopsy*. The most extensive amyloidosis was found in the splenic follicles, the adrenals and the gastro-intestinal mucosa, while the bulkier liver and kidneys showed much less involvement. The spleen weighed 570 gms; the red (vitally stained) follicles were indistinct against the red background of the pulp. The kidneys weighing 315 and 245 gms. had thick pale cortices. Only small tuberculous scars were found. There was marked chronic inflammation of the pleura. The right lung showed chronic pneumonitis, a consequence of the intrance of oil (through a fistula) from the empyema cavity. About a third of the weight of the lung was non-saponifiable oil.

2988—Lipoid Pneumonia. U.C. 4226.

See history 2988. The lipoid pneumonia in this instance was the result of entrance of the lipoid material into the lung through a fistula from an empyema cavity. Another type of pathogenesis is illustrated by the following history.

A 71 year old physician was brought to the hospital because of suicidal morphine poisoning and died the next day. His colleagues stated that he had used intranasal medication containing argyrol and mineral oil for several years. At *autopsy* the lungs showed acute aspiration pneumonia and healed apical tuberculosis. In addition, both lower lobes contained tough pale nodules and bands, not unlike tumour tissue, but stained deeply by Scharlack R. These areas, on microscopic examination, proved to be areas of consolidation due to lipoid pneumonia.

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2989—Organizing Pneumonia and Pneumokoniosis. U.C. 3962.

A Caucasian electric welder of 39 was ill for 3 months with a severe "cold", accompanied by a left pleurisy, and the coughing up of thick, yellow, sometimes blood-tinged sputum. He worked intermittently, and finally came to the hospital when his "cold" suddenly became worse (fever, profuse sweating, severe pleurisy). He had the findings of a left upper lobar pneumonia, with a pleural friction rub; WBC 12-17,000; temperature 104° F. Cultures of sputum, blood, and pleural fluid yielded a type XXI pneumococcus. X-rays showed a slow spread of the pneumonia, and by the time he died (3 weeks after hospitalization) the entire left lung was solid. At *autopsy* the right lung was distended, red and slightly wet. The 810 gm. left lung was solid, with firm, glassy, gray cut surfaces. Small grey-brown firm nodules (containing much iron as well as coal dust and probably silica) were scattered throughout both lungs. (This patient lived and died in the days before the sulfa drugs and antibiotics were put into common use).

2990—Interstitial Virus Pneumonia. U.C. 6802.

No history is available for this section. The following history is substituted:—

A 9½ month old infant had a thin nasal discharge for 2 days prior to her hospitalization. She refused all feedings and four hours before admission began to vomit. She had reddened pharynx, a temperature of 38.2° C., pulse 160, laboured grunting respirations with a rate of 52 per minute. The WBC was 12,400 with 60% polymorphonuclears. Neurological signs suggested a meningitis and, although the spinal fluid was normal, intrathecal penicillin was given at once. Early pneumonia of both upper lobes was suggested by X-rays. Sulfadiazine was started. The temperature rose to 40.4° C. Dyspnea and tachypnea persisted in spite of oxygen therapy. Two days later the WBC was 23,100, abdominal distension developed, and the entire chest was now dull, filled with moist rales. Parenteral penicillin was begun but the infant died quietly that evening. At *autopsy* the lungs were about twice as heavy as normal. Pinkish-white consolidated areas were present throughout all lobes. The lungs were moderately wet and congested. Post-mortem cultures of the tracheal exudate yielded micrococcus catarrhalis, staphylococcus albus, and diphtheroids. No pneumococci were found and no pathogenic bacteria had been isolated during life. The pneumonia was of the viral type, ? influenzal.

2991—Atrophic Gastritis. U.C. 6611.

No significant history available.

This was an incidental finding in a patient having tuberculosis.

(Atrophic gastritis with achylia is not rare in patients with advanced cirrhosis).

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2993—INFARCTION, *Myocardial.* U.C. 6656.

The patient, a 50 year old Caucasian housewife, was a known diabetic. She developed RUQ abdominal distress and pain which radiated to the precordium and left shoulder. The pain was so severe as to require sedation. Twenty-five days after her hospitalization she again developed epigastric and substernal pains radiating down her left arm and expired three days later. *Necropsy* revealed thrombotic occlusion of the left coronary artery, old and recent left anterior myocardial infarction, organizing left myocardial mural thrombosis, myocardial fatty degeneration, bilateral pulmonary edema, focal purulent bronchiolitis and early bronchopneumonia, acute passive congestion of the lungs, liver, spleen and kidneys. The coronary arteries were markedly arteriosclerotic.

3134—ACUTE LYMPHADENITIS.

No history is available for this 19 year old Chinese boy.

On *post-mortem* examination the skin and sclerae were icteric. The liver was purplish and weighed 2,270 gms. Its capsule was covered by a thin layer of fibrin. In the liver substance there were many small abscesses from 1 to 10 mm. in diameter. The mesenteric lymph nodes and the lymph nodes about the hilum of the liver were enlarged. They were moderately soft and the cut surface was greyish white. The section is taken from a lymph node at the hilum of the liver.

3357—PERIPORTAL FOCAL NECROSIS OF LIVER, *Eclampsia.*

This 32 year old Chinese woman, para. 2, gravida 2, was admitted to the hospital in a comatose state. Her health during pregnancy had been good. Previous labour had been normal and spontaneous. She had had three convulsions since the onset of her present labour, which had begun one hour prior to her hospitalization. She regained consciousness between each convulsion. On admission her temperature was 97.7; pulse 118; respiration 27; B.P. 180/120. The urine was dark red and showed a heavy cloud of albumin. N.P.N. was 55 mg. %. Blood urea 65 mg. %, and blood uric acid 5 mg. %. The fetal heart tones were faint and irregular and became inaudible after three subsequent convulsions. The total urine passed on the first hospital day was 8 oz. The patient was sedated and given routine treatment. She had 11 convulsions during her first 3 hours in the hospital and 3 more during the following afternoon. The next morning the B.P. was 140/120, albuminuria 4 plus, and there was slight edema of the legs. During this second hospital day she had 3 more convulsions. Following these she never regained consciousness and died 42 hours after hospitalization. At *autopsy* the dead foetus was found in the uterus with its head engaged in the pelvis. The right ventricle of the heart was slightly dilated and there was slight edema of the lungs. The liver weighed 1,418 gms. and was flabby. Its capsular surface showed a fine network of hemorrhagic areas and the cut surfaces displayed numerous scattered pale pink to yellow areas of necrosis.

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3378—Chronic Glomerulonephritis.

This 20 year old Chinese man had been hospitalized at the age of 17 because of edema of the face. The urine at that time showed albumin, scanty casts and occasionally a few RBC. His plasma proteins were 4.5 gms., and he had a hypercholesterolemia of 360 mgm. %, and a slightly raised blood urea of 40 mgm. %. On his terminal admission three years later he was unconscious following several epileptoform convulsions which had occurred on the preceding day. His relatives stated that one week earlier he had "suddenly become swollen all over," and his urinary output had greatly diminished. On physical examination the face and body were puffy; the pupils were dilated and reacted sluggishly to light; the heart was enlarged and the heart sounds distant; the pulse was 160 per minute, weak but regular; the B.P. 178/116. He lay with a hissing hyperpnea and about him there was the odour of acetone and ammonia. On the day after his admission he died. At *autopsy* the heart weighed 398 gms., and showed slight hypertrophy and dilation of the left ventricle. The kidneys were pale, the architecture on cut surface was not clear and the medullae and cortices together measured 20 mm. in each organ. The capsules were firmly adherent and stripped with difficulty revealing coarsely granular surfaces. The right kidney weighed 100 gms., the left 114 gms. There were small hemorrhages in the cut surface of the cerebrum, pons, external surfaces of the kidneys and in the intestinal mucosa.

4750—Hemorrhage, *Leukemic, Lung.* U.C. 6575.

Eight weeks before hospitalization this 24 year old Caucasian woman noted small red spots on her legs. Subsequent menstrual flow was excessive and two weeks later the lower extremity petechiae reappeared and vaginal bleeding became profuse. On hospitalization her RBC was 2.11 million, Hb 6 gms., WBC 5,200, and platelet count 102,000. The urine was grossly bloody and the stools had a 4 plus benzidine reaction. Despite 10 blood transfusions she became steadily worse and eventually bled from all mucous membranes and the G-I tract. Two weeks after her admission she complained of severe headache and later of respiratory distress and loss of vision. Two days later she expired. *Necropsy* disclosed acute myeloblastic leukemia, massive left cerebral hemorrhage, hemoperitoneum, bilateral pulmonary hemorrhage and edema, hemorrhagic gastritis, hemorrhagic cystitis, myocardial hemorrhage, generalized serous and epithelial petechial hemorrhages.

4752—Recent Infarct Spleen. U.C. 6340.

No history available.

4753—Mural Thrombus, *Aorta.* U.C. 6570.

This 66 year old Caucasian man was hospitalized because of a sudden loss of consciousness. Subsequently he was unable to move his right arm but gradually recovered this function though

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numbness of fingers and palms remained. He also had difficulty in pronouncing his words clearly. He gradually showed increasing recovery from his right sided paralysis but suddenly expired on the seventh hospital day. *Necropsy* revealed cerebral infarction with encephalomalacia, cerebral embolism (?), marked coronary arteriosclerosis, fresh left myocardial infarction, old fibrosed left apical myocardial infarction, left apical ventricular mural thrombus, marked aortic arteriosclerosis with abdominal aortic aneurysm and aneurysmal mural thrombosis.

4755—ATHEROSCLEROSIS, *Aorta*. U.C. 7024.

No history available.

4756—INFARCTION, *Jejunum*. U.C. 6715.

This 62 year old Caucasian business man had been followed in the OPD for some time for various unrelated complaints when finally he complained of lower abdominal pain and a slight loss of appetite. Gastric X-ray and gastroscopy revealed a carcinoma of the stomach. Gastrectomy and cholecystectomy were performed within three weeks of his first complaint. A posterior isoperistaltic anastomosis was performed at the same time. On his fifth post-operative day he vomited 750 ml. of bile stained fluid and his wound disrupted. The dehisence was repaired, transfusions, IV fluids, and other supportive therapy were given but he did not improve. Three days later an exploratory laparotomy revealed an internal hernia containing a strangulated loop of bowel which was judged viable. The hernia was reduced. The patient continued an unfavourable course and expired 13 days after his first operation, 3 days after the internal hernia had been repaired.

Necropsy revealed post-operative state following partial gastrectomy, cholecystectomy and gastro-jejunostomy. The inguinal rings were patent. There was mesenteric thrombosis with infarction of 2 feet of the jejunum distal to the gastro-jejunostomy site. This portion of the bowel was discoloured purplish-red-black and covered by blood and fibrin. Its lumen was filled with red serous fluid and a gelatinous red blood clot adhered to the mucosa.

4757—MIXED THROMBUS, *Iliac artery*. U.C. 6641.

This 62 year old Mexican engineer had a cholecysto-jejunostomy performed because of a carcinoma of the pancreas, as a result of which he experienced relief from his jaundice. His epigastric distress continued, he lost 60 lbs. in 4 months, had nausea and vomiting and when terminally hospitalized 7 months after operation showed a deep jaundice of skin and sclera. He expired about 10 months after the first onset of his symptoms. *Necropsy* revealed an adenocarcinoma of the lower portion of the common bile duct obstructing the common bile duct, the cystic duct and the pancreatic duct. There was acute necrotizing hepatitis, biliary cirrhosis. There was incidental thrombotic occlusion of both iliac arteries.

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4758—Organizing Thrombus, *Vein.* U.C. 6696.

(No history available).

4795—Physiological Hyperplasia, *Breast.* U.C. 6573.

This 29 year old Caucasian primipara was delivered of a normal child by the use of low forceps delivery after a labour lasting 9 hours. The placenta was expressed without difficulty or undue pressure. The uterus contracted but then dilated and became boggy while the episiotomy was being repaired. The patient was given 500 ml. of blood and the uterus was massaged. When she left the operating room the hemorrhage was thought to be under control but bleeding resumed and continued intermittently till her death about 36 hours after delivery despite attempted uterine packing and repeated transfusions. At *necropsy* the 1,500 grams uterus was partially inverted. The endometrium of the inverted portion displayed widely dilated, lacerated vascular sinuses and there were large blood clots in the uterine cavity. The packing gauze was found to fill only the vagina. Additional significant findings were, generalized exsanguination, hemoglobinuric nephropathy, early aspirative bronchopneumonia.

4796—Chronic Passive Congestion, *Liver.* U.C. 6544.

This 61 year old Caucasian housewife complained of severe pain in the right leg together with swelling, hardness and inability to move the leg. On admission to the hospital she was unconscious, her pulse was imperceptible and the B.P. unobtainable. Rales were audible over the entire right chest and breath sounds were wheezing. There was pronounced pitting edema of both legs and ankles. The right leg was ischemic and the left leg reddish with cyanotic mottling. The patient expired the day after admission in peripheral vascular collapse. *Necropsy* disclosed saddle thrombosis of the aortic bifurcation and iliac arteries. Additional significant findings included: obesitas cordis (heart weight 410 gms. There was fatty infiltration throughout the right myocardium and under the right endocardium. The patient weighed 225 lbs. and measured 66 inches in length), right ventricular dilatation, bilateral hydrothorax, ascites, obesity, chronic passive congestion of the liver (the liver weighing 1,780 gms. and displaying pronounced "nutmeg mottling").

4797—Zenker's Hyaline Degeneration. U.C. 6530.

No history available. The changes seen here have occurred in a skeletal muscle as a result of inflammatory changes.

4798—Pylethrombophlebitis. U.C. 7024.

(No history available).

Such inflammation of the portal vein with thrombosis is not uncommon in connection with acute intra-abdominal infections that can drain into the portal systems, e.g. acute appendicitis, acute cholecystitis.

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4799—Senile Atrophy, *Ovary*. U.C. 6544.

This was an incidental finding at *autopsy*. See history 4796.

4833—Acute Cholecystitis.

A Chinese man, aged 55, gave a history of fever and abdominal pain for four days. At *post-mortem* examination the skin and sclerae were icteric. The abdomen was distended. The peritoneal surfaces were covered with a thick brownish yellow fibrinous exudate. The liver was brownish yellow and on cut section there was a fine, green mottling. The circumference of the common bile duct varied from 20 to 35 mm. and the cystic duct had a circumference of 13 mm. A brownish-black stone, measuring 6 × 18 mm., was impacted in the distal end of the common duct and no bile escaped past this obstruction. The biliary tree was dilated throughout and the bile ducts showed hemorrhagic spots in their walls. The gall bladder measured 7 × 4 cm. and its wall was 5 to 10 mm. thick. On its mucosal surface there were numerous ulcers varying in size from 1 to 20 mm. They were covered by brownish necrotic material.

4897—Amniotic Embolism, *Lung*. U.C. 5059.

This 26 year old housewife was hospitalized following an uneventful gestation period of 42 weeks. In spite of powerful pains the fetal head failed to engage and X-rays demonstrated that it was somewhat large. Eleven hours later vaginal examination revealed the head to be engaged, the cervix dilated and the membranes ruptured with an abundance of meconium. Fetal heart tones were normal. There was no further progress. The following morning her condition was not alarming, but by noon her pulse had become rapid. Ringer's solution was started but by 2:30 p.m. she was perspiring cold and clammy, cyanotic with rapid respirations and a rapid thready pulse. A few rales were heard in the chest. She was given morphine and placed in a sitting position; 300 ml. of blood were withdrawn and digalin was given. Nevertheless pulmonary edema became more marked and she expired at 3:15 p.m. after a labour of about 36 hours. At *autopsy* the lungs together weighed 1,700 gms. (normal each 700 gms.). They were greyish-pink, sub-crepitant and very wet with no areas of consolidation. The uterus was filled by the dead infant, its head engaged. The endometrium was stained by meconium and the placenta was only focally detached.

4953—Serous Atrophy, *Bone Marrow*. U.C. 6577.

This 68 year old Caucasian man gave a history of difficulty in swallowing solid foods for six months, and a weight loss of 25 lbs. in four months. The day before hospitalization he first noted swelling of his ankles. X-ray examination revealed neoplastic stenosis of the greater portion of his esophagus. He had a moderate anaemia. RBC 3.66 million, Hb. 11.5 gms.,

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WBC 13,900. Total plasma proteins were 4.17 gms., with albumin 2.98 gms., globulin 1.19 gms., and A/G 2.58. During a thoracentesis performed in the hospital a pneumothorax was inadvertently produced. Neoplastic cells were found in the pleural fluid. The patient became progressively weaker and more dyspneic and expired after about three weeks of hospitalization. *Autopsy* disclosed a spindle cell sarcoma (neurogenic or leiomyomatous ?) of the middle third of the esophagus with metastases to the regional lymph nodes. In addition there was bilateral pulmonary edema, bilateral pleural effusion, marked serous atrophy of fat, gelatinous degeneration of the bone marrow. The body was 5′ 6″ in length and weighed 157 lbs.

4954—Serous Atrophy of Fat, *Pericardium.* U.C. 6701.

This 60 year old Caucasian man had a resection of an adenocarcinoma of his rectum following a weight loss of 40 lbs. in one year. Subsequently he was comfortable, but not well for six months. His symptoms then recurred and examination revealed recurrent adenocarcinoma with metastases. Paliative colostomy and multiple enterostomies were performed. At this time his plasma proteins were 5.68 gms. with A/G 1.77. RBC 4.3 million and Hb 12.9 gms. The patient continued to suffer from anorexia and weight loss till his death.

Necropsy disclosed recurrent fungating and ulcerating adenocarcinoma of the sigmoid colon with regional extension. There was extreme emaciation (length 68 inches, weight 109 lbs.) generalized serous atrophy of fat, myeloid hyperplasia with early gelatinous degeneration, generalized muscular atrophy, hydropericardium, brown atrophy of heart and liver.

4955—Squamous Metaplasia, *Trachea.* U.C. 6743.

(No history available). Metaplasia *per se* does not cause symptoms.

4956—Fatty Infiltration, *Heart.* U.C. 6359.

A short, obese Caucasian housewife of 57 was admitted to hospital in coma and, as suspected from the history, was the victim of a cerebral hemorrhage. Since a fall 3 weeks previously she had suffered from severe headaches. On the night before admission she had complained of headache, vomited, lost consciousness and could not be roused. When admitted there was generalized hyperreflexia; cardiac enlargement; pulse 116, B.P. 190/130. She died 8 hours later, and the *autopsy* revealed cerebral hemorrhage, moderate arteriosclerosis, obesity (ht. 62 inches, wt. 170 lbs.), marked fatty infiltration of the heart and pancreas (adiposity) and of the liver (in parenchymal cells). The heart weighed 405 gms., but much of the excess weight was contributed by adipose tissue. This covered most of the epicardial surfaces, obviously infiltrated the musculature, especially of the right ventricle, and appeared beneath the endocardium as glistening yellow patches up to 1.5 cms. in diameter.

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4957—Calcification, *Rheumatic Mitral and Aortic Valvulitis.*
[U.C. 6464.

When hospitalized because of symptoms referrable to a carcinoma of the prostate, this 66 year old Caucasian man also complained of having had dyspnea for 6 months. Physical examination revealed the carcinoma of the prostate, for which a bilateral orchiectomy was performed. The heart was found to be enlarged both to the left and to the right. B.P. 130/70. There were aortic systolic and diastolic murmurs heard. The systolic murmur was loud, harsh and accompanied by a thrill. The pulse was regular. There were rales in both lung bases. Aortic stenosis was diagnosed. After his discharge the patient's dyspnea became more pronounced, especially when resting. He was re-admitted. X-rays showed consolidation of the right upper lobe and EKG revealed a severe intraventricular conduction defect. Oxygen therapy was necessitated except for short intervals and the patient became progressively weaker despite therapy, finally dying while in a coma. *Autopsy* disclosed calcific aortic (rheumatic) valvulitis with stenosis and insufficiency, old healed rheumatic mitral valvulitis with calcification of the mitral ring, healed atrial and ventricular endocarditis and myocardial hypertrophy. The aortic valve leaflets were rigid and unyielding due to marked calcification and fusion of their commissures. The aortic orifice was slit-like with a greatest length of 3 cms. and a greatest width of 8 mm. There were hard, calcified verrucous vegetations on both surfaces of the leaflets. The heart weighed 730 gms., the predominant hypertrophy being of the left ventricle the wall of which was 20 mm. thick while the right myocardium was 4 mm. thick. There were no arteriosclerotic changes in the aorta.

4958—Metastatic Calcification, *Lung.* U.C. 2939.

When first seen at a hospital this 59 year old Caucasian boiler-maker had been suffering from osteitis fibrosa (Paget's Disease) for 9 years. There had been gradual enlargement of the head; bowing of the tibias; scoliosis; stiffness and pain in many joints; and, recently, diminishing vision. X-ray studies demonstrated changes typical of Paget's Disease. Blood calcium and phosphorus tended to be high (Ca 10.10 to 11.83 mg. %; P 3.7 to 4.55 mg. %). As a clinical experiment, the patient was treated with massive doses of Vitamin D (as irradiated ergosterol). He received 5,000,000 U.S.P. units in 2 weeks. He then left the hospital and nothing further is known of his history till bronchopneumonia terminated his life several months later. The *autopsy* revealed advanced osteitis deformans, affecting the skull (and optic foramina), maxillae, mandible, sternum, vertebrae and vertebral ends of the ribs, pelvic bones, long bones of the legs, and bones of the forearms. Metastatic calcification was observed in the lungs, endocardium (left atrium), kidneys, gastric mucosa and skin. The heavy voluminous lungs held their shape and were firm but slightly crepitant. Their cut surfaces were grey-white and

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granular simulating soft bone with tiny pores. (Note: Since metastatic calcification had not previously been described in association with Paget's Disease, the role of Vitamin D was under suspicion in this case. Subsequently writers have suggested that such therapy is contraindicated, since calcium seems to be more readily mobilized from the bones in Paget's Disease than it is from normal bones).

4959—Tatoo, *Skin.* U.C. 6763.

This was an incidental finding at *autopsy.*

4960—Acute Yellow Atrophy, *Liver.* U.C. 6930.

No history available.

An Illustrative History: A 60-year-old woman complained of progressive lower abdominal pain accompanied by extreme fatigability and asthenia of about a week's duration as well as by itching of the skin and intense jaundice. She had a history of rheumatism and had been taking 21 grains of cinchophen a day for about two weeks before the onset of present symptoms. On physical examination, she presented a moderate degree of jaundice. She was in a semistuporous condition from which she could be roused with difficulty and she was not mentally clear. Abdomen was distended but not rigid. Generalized tenderness was noted over the liver, which was palpable along the edge of the costal cage. Laboratory findings: The stools were bile-stained; urine showed the presence of bile. There was an indirect, immediate van den Bergh and an icterus index of 90 units. Subsequent course: The jaundice became progressively deeper. The patient became much weaker, and stupor developed into true coma in which the patient died three days after admission. At *autopsy,* marked jaundice was noted. There was about 2,500 cc. of bile-stained fluid found in the peritoneal cavity. The liver was small and atrophic, weighing 525 gms. On section it was of a mottled golden brown with patches of dark greenish-red. In the brownish areas there was some nodular elevation of the surface, while in the intermediate greenish areas, the surface of the liver was depressed. No very striking anatomic distribution of the process could be made out. The microscopic appearance of sections from the liver suggested a phase of yellow atrophy in its beginning healing stage (since there was a patchy fibrosis associated with the degenerative changes), obviously following an acute attack of which the etiology was undetermined, but in which cinchophen poisoning was strongly suspected. (This abridged history is borrowed from Smith and Gault, "Essentials of Pathology").

4961—Hemochromatosis, *Liver, Pancreas, Lymph node.*
[U.C. Hosper.

No history is available for these specific slides. An illustrative history for a similar case follows.

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For 18 months a 50 year old Caucasian butcher had polyuria, marked thirst, weight loss and leg cramps referrable to diabetes mellitus. Other complaints were of dyspnea, orthopnea, non-productive cough and ankle oedema. X-rays showed his heart to be 20% oversize. The B.P. was 118/70; WBC 2,500; RBC 4.4 million. The urine showed 4 plus reduction and 2 plus albumin. He was discharged after a 3 month period of hospitalization during which his diabetes had been well controlled. Over-exertion quickly led to a return of symptoms of heart failure. He was brought to the hospital moribund and his blood sugar level was found to be 343 mg. %. He died in spite of emergency treatment. The *autopsy* findings were: generalized hemochromatosis with marked hepatic pigmentary cirrhosis (liver weight 3,810 gms.). The other organs markedly affected were the pancreas (80 gms.) abdominal lymph nodes, gastro-intestinal tract and skin. The hypertrophied heart (490 gms.) showed considerable iron in muscle fibres, as well as intestitial fibrosis and fatty degeneration. There was marked generalized atherosclerosis.

5097—Focal Necrosis, Liver: *Typhoid Fever.* U.C. 211176.

History not available.

The history of a similar case is as follows:

A 26 year old Caucasian truck driver worked at an institution where there was an epidemic of typhoid fever due to a faulty sewage disposal system leaking into the well from which the water supply was drawn. He first complained of chills and fever, malaise, bone-aches, hacking cough and diarrhea 3-4 weeks before his death. His physician said that his illness "looks like typhoid" but did nothing to establish a diagnosis. The patient was able to return to work for a day or two and then his chills recurred, he had fever and 8-10 loose stools daily. This time his doctor sent him home to bed, but his illness was undiagnosed till he was hospitalized 10 days later. While there he passed one bloody stool. He was transferred to another hospital 3 days ante-mortem and was then irrational, covered with perspiration and his skin was generally flushed (too late for rose spots). His abdomen was distended and tympanitic, his spleen palpable 4 cms. below the ribs. He had a red throat, with patches of exudate; rales were heard. His pulse was rapid, 120-160; his temperature was never below 102° F. and was usually 104-106° F.; WBC 4,800 to 5,650, with 50% polymorphnuclears; Hb 16-18 gms. (hemal concentration); 2 plus albuminuria, with casts and WBC; Widal test strongly positive; cultures of blood and stool positive for B. typhosum. Diarrhea had ceased and the terminal course was marked by abdominal distension, cyanosis and stupor with signs of cardiovascular collapse. At *autopsy* there was extreme gaseous overdistention of the bowel, with ulcerated swollen Peyer's patches, and large solitary lymph follicles in the colon; hyperaemia and swelling of the mesenteric lymph nodes; splenomegaly (850 gms.) with the spleen so bloody and soft that it ruptured when handled;

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a large (2,700 gm.) pale liver with bulging cut surfaces; cholecystitis with turbid pale bile; pale swollen kidneys (microscopic, interstitial nephritis); a dilated heart with pale flabby myocardium; fatty and parenchymatous changes in the important viscera. B. typhosum was grown from the blood, bile and splenic pulp.

5218—Puerpural Sepsis.

This 38 year old Chinese woman, para. 6, had fever, abdominal pain, blood stained stool and diarrhea for 3 days prior to delivery. Following the delivery of a still-born infant her diarrhea, fever and abdominal pain continued until her death. At *autopsy* the vagina presented extensive ulceration along the posterior two-thirds of its wall. The ulcer base was covered by grayish, dirty-appearing matter. The uterus was enlarged measuring 13 × 9 × 4 cms. and its wall was 2.5 cms. thick. The endometrial surface was covered by a thick layer of yellowish necrotic material and there were minute hemorrhagic spots. The fallopian tubes and ovaries were not remarkable. The consistency of the lungs was slightly increased and the cut surfaces appeared hyperemic and edematous.

5373—Diphtheria.

The patient was a 7 year old girl referred from another hospital as a suspect case of diphtheria. The child was severely ill and treatment, including tracheotomy and artificial respiration, was of no avail. At *post-mortem examination* the posterior pharyngeal wall and tonsils were covered by a thick dirty yellow membrane which was sufficiently adherent to be removed with difficulty, revealing a hyperemic red tissue surface. Section through a tonsil demonstrated that this membrane was 1 mm. thick. A similar thick membrane, loosely attached, lined the walls of the trachea and main bronchi and nearly obliterated the lumens of the bronchi. The paratracheal lymph nodes were enlarged. The lungs were emphysematous and on section some of the bronchioles were also found to be plugged by membranous material.

5949—Virus Pneumonitis.

This 8 year old Chinese boy recovered from measles six days before his death. Three days before his death he developed fever and a cough, became progressively more ill and died with respiratory distress. At *autopsy* there were no residual evidences of measles. The lungs were markedly emphysematous. Their cut surfaces were hyperemic and presented multiple small grayish yellow spots averaging about 1-2 mm. in diameter. The bronchiolar mucosa was red and the lumens were filled with purulent matter. The right auricle and ventricle were dilated. The other viscerae were moderately hyperemic.

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6120—Diphtheria, *trachea.*

No history is available for this 4 year old girl, whose post-mortem examination was performed in a public mortuary. At *autopsy* the body was found to be normally developed but poorly nourished. The posterior wall of the pharynx was covered by a relatively dry, yellow membrane which was 1 mm. thick. About half of the tonsilar surfaces were covered by finely granular yellowish exudate which was removed with difficulty. The epiglottis and larynx were hyperemic and edematous and the posterior wall of the larynx was also covered by a membranous exudate. This membrane extended down the whole length of the trachea and into the bronchi, in places being as thick as 2 mms. and mixed with mucoid, yellowish matter. The upper lobes of the lungs were emphysematous and the lower lobes were firm, hyperemic and partially atelectatic with membranous material plugging the bronchioles. The right ventricle of the heart was dilated and the myocardium was brownish-yellow and slightly transluscent. The paratracheal lymph nodes and the spleen were enlarged.

8591—Portal Cirrhosis.

No clinical history is available for this 54 year old man. *Post-mortem examination* presented a well-developed and well-nourished Chinese male whose abdomen was distended by gas accumulated in the intestine, but contained no free fluid. The liver weighed 1,986 gms. and measured 25 × 15 × 8.5 cms. Its consistency was firm and its capsular surface was markedly nodular. Its parenchyma cut with increased resistance and the cut surfaces presented a distorted architecture in that it was divided into nodules, varying from pin-point size to 5 cms. in diameter, by traversing bands of fibrous tissue. Blood vessels in the portal areas were prominent. The spleen weighed 908 gms. and its parenchyma was so soft that the pulp scraped off readily. The parenchyma had a brownish tinge. In the splenic vein there was a ball thrombus measuring 22 × 20 mms. and attached to the wall by a pedicle extending centrally toward the portal vein.

9699—Acute Appendicitis with Peritonitis.

The patient, a 39 year old Chinese male, experienced a sudden attack of abdominal pain accompanied by vomiting and fever. The episode lasted for 5 days, at which time he was hospitalized. Physical examination revealed generalized abdominal tenderness. On laparotomy there was found to be acute peritonitis with a perforation in the region of the appendix which was inclosed in a tumour-like mass of inflammatory tissue. The *surgical specimen* included this inflammatory mass together with the distal 7 cms. of ileum, 11 cms. of ascending colon and a number of lymph nodes. The mucosal and submucosal layers of the ileum were edematous as was also the colon. The appendix and inflammatory tissue comprised a mass measuring 7 × 4 × 2.5 cms. The appendix

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was so bound up in this mass that its form was not distinct. This mass of tissue was grayish-white and had a lumen measuring 4 mms. in diameter which was filled with grayish-white cheesy material. No fecolith was found.

9887—Biliary Cirrhosis.

This 30 year old Chinese woman indicated that she had had intermittent episodes of yellowish discoloration of her skin for 3 years. No further clinical history or indication of the pathogenesis of her disease is available. The present section is derived from a biopsy specimen which had a slightly granular capsular surface.

9975—Fistula-in-Ano.

This 32 year old Chinese man presented a three month history of a perineal ulcer draining pus and blood. Chest X-ray examination was negative. The ulcer proved to be the external opening of a fistulous tract which communicated with the rectum. The fistula was excised surgically.

Note: Fistulous tracts frequently develop in the anal area. They are generally thought to be due to infection in the crypts of Morgagni of the rectum, with penetration of the bowel wall and extension into the surrounding tissue. About 10 per cent are tuberculous in nature. The remainder are probably pyogenic infections in which, in some cases, the reaction simulates tuberculosis because of the foreign-body giant-cell reaction which occurs as a result of the passage of fecal material through the fistulous tract. (Anderson, "Pathology").

10081—Pyosalpinx.

The patient, a 28 year old Chinese housewife, had progressive dysmenorrhea for 3 years. No further clinical history is available. The *surgical specimen* was presented as two Fallopian tubes and a bit of adipose tissue. One tube measured 13 cms. in length and had a diameter of 1.5 cms. at its proximal end and 3 cms. at its distal end. It was firm, grayish-yellow, coiled and covered by fine thread-like exudate. The lumen was filled with greenish yellow pus. The mucosal surface was irregular and granular and in some areas presented small caseous-like grayish-yellow spots. The wall of the tube was 5 to 8 mms. thick. Toward the distal end it thinned out being only 1 mm. thick at one point where there was a large accumulation of pus. The second tube was 11 cms. long and cystic, having a proximal diameter of 1 cm. and a distal diameter of 3 cms. It contained clear, amber fluid, had a smooth shiny lining and a wall that was 1 to 3 mms. thick.

An illustrative history: A 42 year old housewife was hospitalized because of her complaints of low back pain on stooping and pain in the abdomen for the previous 18 months. The history revealed that she had had one full term pregnancy and two abortions, long in the past. She stated that she had had a vaginal

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discharge for "years". Tenderness was evident on palpation in the right lower quadrant and a pelvic examination revealed a large fluctuant tender mass located behind and to the left of the uterus. The WBC and temperature were normal. X-ray examination of gastro-intestinal tract revealed no abnormality and the diagnosis of adnexal inflammatory mass was made. Cervical smears and cultures were negative for Neisseria Gonorrheae and no history of gonorrheal infection was elicited. A laparotomy revealed an old pyosalpinx in the left adnexa and marked thickening of the right fallopian tube. Because of her age a total hysterectomy and a bilateral salpingo-oophorectomy were performed. *Pathological examination* of the specimen revealed a 4 × 4 cm. cystic mass adjacent to and incorporated in the left fallopian tube, which was imbedded in adhesions. The right tube measured 1 cm. in diameter and had a thick wall. On cut section pus exuded from the lumina of both tubes. (This was not cultured; after the acute stage of a gonoccoccal salpingitis other types of organisms are often cultured, and no surviving gonococci found).

10461—Tuberculous Lymphadenitis.

This lymph node originated with a 5 year old boy for whom no history is available. In childhood type tuberculosis extension to lymph nodes is a common finding. The pathogenesis of such lesions is considered fully in later studies of the processes of granulomatous inflammation.

10586—Gastric Ulcer.

The patient, a 44 year old Chinese woman, occupation amah, had intermittent epigastric pain accompanied by vomiting for two years. One month prior to hospitalization she vomited blood. Following a diagnosis of gastric ulcer, a portion of her stomach was removed surgically. The *surgical specimen* consisted of a large portion of the stomach having attached to its lesser curvature a pyramidal section of liver measuring 2.5 × 4 × 2 cms. On the mucosal surface of the lesser curvature there was an ulcer measuring 3 × 1 × 1.5 cms. and having slightly rolled margins. The rest of the stomach was not remarkable. The section of liver was not grossly abnormal.

10818—Gastric Ulcer.

This 61 year old Chinese housewife gave a history of having had epigastric pain intermittently for 30 years. No further history is available, save that a portion of the stomach was removed surgically. *Gross examination* of the specimen presented a portion of stomach 12 cms. long and 7 cms. wide. On its external surface the blood vessels were slightly engorged (this is not necessarily abnormal in surgical specimens where the circulation is often interfered with surgically by the placing of clamps and hemostats). The gastric mucosa was not remarkable save for an ulcer located near one of the amputated ends of the stomach. The

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ulcer had even margins and in the base there was a 6 mm. perforation extending through the serosa. About the outer opening of this perforation there lay a clotted mass of blood.

11297—Bronchiectasis.

The patient, a 19 year old school boy, gave a three year history of cough with blood streaked sputum and for the past year the bleeding had been more pronounced. A diagnosis of bronchiectasis was made and the left lower lobe of the lung was removed surgically. On *gross examination* the specimen weighed 114 grams and the pulmonary tissue was leathery to palpation. The cut surface presented dilated bronchioles having thickened walls and the surrounding tissue was atelectatic. The bronchiolar mucosa was coarsely granular. The peribronchial lymph nodes were markedly anthracotic.

11596—Phlegmon and Metastatic Pulmonary Abscess.

Adequate clinical history is not available for this 59 year old man. He was, however, a destitute individual suffering from lepromatous leprosy as a complication of which he had several ulcers of the lower extremities. These ulcers became infected secondarily and were treated locally. The patient died with signs of generalized toxemia. *Autopsy* confirmed the diagnosis of leprosy. There was almost complete sloughing of the right heel and the os calcanius protruded from the ulcer. The calf of the right leg was fluctuant and when incision was made through the skin creamy fluid pus escaped in great quantities. The purulent matter was found to be generalized in the subcutaneous tissues of the entire calf and to extend into the adjacent muscles and along the fascial planes. The left lower pulmonary lobe contained a 1.5 cm. abscess which likewise contained purulent matter. The right inguinal lymph nodes were hyperplastic as were also the liver (1,788 grams) and the spleen (440 grams).

13949—Bronchiectasis.

This 27 year old Chinese housewife complained of intermittent productive cough since childhood. In the past two years the sputum production had increased. A bronchogram showed bronchiectatic changes in the left lower pulmonary lobe. This lobe was surgically removed. *Gross examination* of the surgical specimen showed that the pleural surfaces were thickened and fibrotic. The parenchyma underlying the upper surface was cystic while that of the lower portion of the lobe was firm and nodular. On cut section the bronchioles were found to be dilated to form cysts having diameters varying from 5 to 30 mms. and containing jelly-like mucus. The walls of these cysts had smooth linings in which vascular plexes were clearly evident.

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13210—Virus Encephalitis.

This 20 year old man was hospitalized after having had fever and headache for 14 days. The onset of chills and fever was sudden. The headache became progressively more pronounced. Two or three days after the onset he developed vomiting with epistaxis. His mental state gradually became confused and five days before his death he was admitted to the mental hospital. His sleep was disturbed by nightmares. Inability to pass urine necessitated catheterization. When transferred to Queen Mary Hospital he was comatose and cyanotic. Corneal reflexes were absent and he did not respond to painful stimuli. Axillary temperature was 97° F., pulse 110, respiration 20. The pupils were widely dilated and did not react to light or accommodation. There was bilateral papilledema but no hemorrhage or exudate evident on fudu-copic examination. There was marked neck rigidity. Dernig's sign was negative and the plantar responses could not be elicited. Muscle tone was normal and the reflexes were normal and bilaterally equal. On lumbar puncture the C.S.F. was found to be under normal pressure, was clear and presented 320 lymphocytes per cu. mm. Pandy test was positive and sugar was 82 mg. per cent. The patient's RBC was 4.5 million, Hgb. 14 gms., and WBC 8,500. He rapidly became cyanosed and died a few hours after admission. At *autopsy* all the viscerae appeared normal. The blood vessels in the white matter of the brain were hyperemic but there was no other gross change discernible.

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